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The use of super-selective mesenteric embolisation as a first-line management of acute lower gastrointestinal bleeding

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HIGHLIGHTS

- A study into the efficacy of mesenteric embolisation in managing acute lower GI bleeding.
- Mesenteric embolisation is an effective management for localised acute lower GI bleeding.
- Our results compare favourably with published experiences of other institutions.
- It is first-line practice at our institution to embolise localised acute lower GI bleeds.

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ABSTRACT

Introduction: In this study, we aim to assess the efficacy and safety of digital subtraction angiography (DSA) and super-selective mesenteric artery embolisation in managing lower gastrointestinal bleeding (LGIB) at a multi-centre health service in Melbourne (Australia).

Method: A retrospective case series of patients with LGIB treated with superselective embolisation in our area health service. Patients with confirmed active LGIB, on either radionuclide scintigraphy (RS) or contrast-enhanced multi-detector CT angiography (CE-MDCT), were referred for DSA, and subsequently endovascular intervention. Data collected included patient characteristics; screening modality; bleeding territory; embolisation technique; technical and clinical success; short to mediumterm complications and mortality up to 30 days; and the need for surgery related to procedural failure or complications.

Results: There were 55 hospital admissions with acute unstable lower gastrointestinal bleeding that were demonstrable on CE-MDCT or RS over a 30-month period (from 1 January 2014 to 30 June 2016). Of these, eighteen patients were embolised. Immediate haemostasis was achieved in all embolised cases. Eight patients (44%) had clinical re-bleeding postembolisation and warranted repeated imaging. However, only one case (5.6%) had active bleeding identified and was re-embolised. There was no documented case of bowel ischemia or ischemic-stricture and none progressed on to surgery. 30 day mortality was zero.

Conclusion: Super-selective mesenteric embolisation is a viable, safe and effective first line management for localised LGIB. Our results overall compare favourably with the published experiences of other institutions. It is now accepted first-line practice at our institution to manage localised LGIB with embolisation.

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1. Introduction

Lower gastrointestinal bleeding (LGIB) is defined as bleeding from a source distal to the ligament of Treitz and represents 20–24% of all cases of gastrointestinal bleeding [1,2]. The incidence of LGIB ranges from 20.5 to 27 cases per 100,000 in adults in the USA [2,3], and increases markedly with age, reflecting underlying diseases such as diverticular disease, angiodysplasia, colitis and neoplasia [2–4].

Endoscopic and angiographic interventions have reduced the need for surgery in most cases of severe LGIB. Surgery would involve either directed segmental colectomy; blind segmental colectomy; or subtotal colectomy. It is usually reserved for unstable patients who have failed conservative, endoscopic or endovascular management. There is an increased mortality rate associated with blind segmental and subtotal colectomy, particularly in elderly patients with medical co-morbidities [3].

Western Health, a multi-centre institution servicing a large metropolitan area in Melbourne (Australia), has embraced super-selective embolisation of LGIB as an important treatment modality. It can obviate the need for surgery where endoscopy would otherwise be unsuccessful. Unstable patients who thus present with severe LGIB undergo screening with either contrast-enhanced Multi-Detector Computed Tomography (CE-MDCT) or Radionuclide Scintigraphy (RS). Following identification and localisation of active bleeding in a vascular territory, the patient is transferred to the digital subtraction angiography (DSA) suite for further investigation and, where feasible intervention.

The aim of this study is to review our institution's experience and compare it to the existing body of evidence on arterial embolisation of LGIB.

2. Methods

This study is a case series of patients presenting with LGIB treated with super-selective embolisation reported in line with the PROCESS criteria [5]. A search was performed through our DSA suite logbook. Our inclusion criteria consisted of all patients with confirmed LGIB (on either RS or CE-MDCT) and referred for angiography. All patients found to have active bleeding subsequently underwent endovascular treatment. Those patients who had bleeding from sites other than the lower gastrointestinal tract were excluded. The catchment for this institution consists of the western metropolitan region of Melbourne, Australia. There are three campuses that service this area however patients with LGIB requiring immediate treatment are transferred to the main campus where interventional radiological services are concentrated.

Following patient identification, a review of their medical records was performed. Data included patient characteristics such as age, sex and co-morbidities; screening modality (RS and/or CE-MDCT); bleeding territory; embolisation technique; technical success; clinical success; short to medium-term complications including infarction, ischemia-related stricture and mortality up to 30 days; and need for surgery related to procedural failure or complications.

Technical success was defined as cessation of contrast extravasation as demonstrated on DSA after deployment of embolising agent. Clinical success was defined as normalisation of vital signs; no further need for fluid resuscitation; transfusion requirement of less than two units of packed red blood cells; and no further radiologically demonstrated LGIB and subsequent further intervention for ongoing LGIB. All cases achieved 30-day follow-up and those cases performed up to March 2016 achieved 6-month follow-up.

3. Results

During the period of 1 January 2014 to 30 June 2016, there were 414 patients admitted with the diagnosis of acute lower gastrointestinal bleeding across all three campuses as obtained via the Diagnosis Related Group (DRG) coding from the institution's health information service. 62 of them were haemodynamically unstable on admission and underwent CE-MDCT or RS, of which 55 demonstrated LGIB. All 55 of these cases progressed onto DSA without any significant delay with the intention of endovascular intervention.

One case was excluded on grounds of pan-gastrointestinal bleeding in a patient who was diagnosed with hemophagocytic syndrome consisting of pancytopenia and disseminated intravascular coagulation. Micro-coil embolisation was employed with success at controlling a significant bleeding point in the terminal ileum. However, this patient eventually died from hepatic failure.

Out of the remaining 54 cases of LGIB investigated with DSA, 18 cases (33%) had endovascular intervention. These 18 cases had a male to female ratio of 2:1. The median age was 74.50 years (range 59–92). There was no active bleeding demonstrated on DSA in the remaining 36 patients, hence, no endovascular intervention was performed. Ten patients (56%) were on anticoagulation/antiplatelet medications prior to admission: six patients were on aspirin alone; three on aspirin plus clopidogrel; and one on warfarin. The indication for warfarin was for an in-situ mechanical heart valve. Patients on clopidogrel were prescribed for recent insertion of coronary artery stents while patients were on aspirin for prophylactic treatment of cardiovascular accidents (CVA).

6 of the 10 patients on anticoagulation/antiplatelet medications were part of the group that underwent endovascular intervention while the remaining 4 patients did not. Given the risk of cardiovascular and cerebrovascular events, patients on warfarin were bridged with low-molecular-weight heparin (LMWH) prior to any intervention. Patients on both aspirin and clopidogrel had clopidogrel withheld on admission but remained on aspirin, while patients on aspirin only remained on it prior to any intervention. The effect of anticoagulation/antiplatelet medications on LGIB was not measured as an endpoint in this study. Further studies looking

Table 1
Demography.

Demography	Number
Gender	
• Male	12 (67%)
• Female	6 (33%)
Median Age	74.50 (Range 59–92)
Co-morbidities	
• Ischaemic Heart Disease	7 (39%)
• Atrial Fibrillation	3 (17%)
• Hypertension	12 (67%)
• Diabetes	6 (33%)
Anticoagulation	
• Aspirin	6 (33%)
• Aspirin + Clopidogrel	3 (17%)
• Warfarin	1 (6%)